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Part II - Legal Aspects of Aerobic Capacity: Objective Evidence of the Ability to Work

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Introduction

In Part I of this two part series, we examined the legal relevance of aerobic capacity in cases where age was used to determine work capacity. In Part I, law and policy mandated retirement for police and wildlife officers who were 55 and older were based on observations, reports, and assumptions about whether this group could effectively perform their duties. The mandates were upheld in court primarily because of evidence from physiologists, serving as expert witnesses, about the minimum metabolic requirements to perform required duties and the inevitable declines in aerobic capacity as a consequence of aging. Concepts relevant to fatigue, MET levels, and aerobic capacity were inextricably linked to the legitimacy of policy and law mandating age-based retirements.

In Part II, we examine exercise stress testing and aerobic capacity in disability cases. In order to receive disability related insurance benefits patients/claimants must objectively document restrictions on the ability to engage in “substantive gainful employment,” which is typically defined as a 40-hour work week. Chronic Fatigue Syndrome (CFS) receives the primary focus because it is an illness whose cornerstone symptom is debilitating fatigue, an event that is subjectively experienced but that can be objectively documented.

Cardiopulmonary exercise testing (CPET) (or aerobic testing) is arguably the most clinically relevant and objective approach to determining work capacity and to document fatigue. A substantially impaired aerobic capacity or a low anaerobic threshold, for example, can document functional impairments that render a CFS patient unable to work. The results of aerobic capacity testing have been used in legal proceeding to determine whether or not a disabled claimant is entitled to

insurance benefits. However, more commonly the courts rely upon the Functional Capacity Evaluation (FCE) to assess restrictions on the ability to work.

The FCE is administered and interpreted by licensed clinicians, including physical therapists, occupational therapists, and physicians. Consequently, these professionals are commonly recognized in the legal arena as experts regarding work capacity. FCE test batteries involve the measurement of physical characteristics that are thought necessary to perform work, by way of documenting performance on several different physical tasks. Physical characteristics commonly involve lifting strength, grip strength, range of motion, and pain. Many different FCE test batteries have been described. Each test battery demonstrates high inter-tester reliability, intra-tester reliability, and prognostic value for predicting return to work in the industrial rehabilitation setting. Validity and reliability data for FCE test batteries have involved both healthy individuals and industrial patients with pain-related conditions. Therefore, because FCE fails to assess metabolic capacity, this article posits that the CPET offers a superior approach to objectively documenting the ability to work when fatigue is central to a medically diagnosed condition. This article also maintains that both the courts and professionals charged with the assessment of work capacity need to be more cognizant of the advantages of the CPET. This responsibility has profound significance for the claimant who is so dependent upon the effective, accurate, and objective documentation of metabolic issues critical to any determination of work capacity and fatigue.

CHRONIC FATIGUE SYNDROME

Chronic Fatigue Syndrome (CFS) is an illness characterized by a debilitating fatigue that cannot be explained by another physical or mental disorder and that causes impaired physical and/or occupational work capacity. It is a controversial condition that presents problems in the world of disability law for a number of reasons. The CFS illness is regarded as a “subjective” illness because its diagnosis is based largely upon the self-report of the patient to the treating physician. There is no known cause for the illness nor is there a widely accepted objective laboratory test to confirm the diagnosis. The illness may be episodic in nature and is characterized by patients with varying levels of functional capacity and by symptoms that overlap with other illnesses (e.g., sore throat, muscle pain, joint pain, tender lymph nodes in the neck or auxiliary area, non-refreshing sleep, and post-exertional malaise lasting more than 24 hours) (Holifield, 2009, p. 1235; Nickel, 2008, pp. 874, 875; Social Security Ruling (SSR) 99-2p, 1999). These overlapping symptoms make it difficult to distinguish CFS from other illnesses. Nevertheless, legal disputes about a claimant’s entitlement to disability benefits do not typically challenge the attending physician’s diagnosis. Instead, the challenge is premised upon the claimant’s ability to engage in *any* substantial gainful employment, including the most sedentary occupations.

The initial burden is on the CFS claimant seeking disability related benefits to objectively establish a medically determinable impairment (MDI) that is serious enough to cause the inability to work on a regular basis. The record must contain a clinically significant and objective documentation of disability. In the absence of a

definitive test for CFS, the Social Security Administration (SSA) allows reliance on certain laboratory findings including an “abnormal stress test” using medically accepted protocol (Ibid). The SSA does not define an “abnormal stress test” and it is left to experts to explain and interpret the results of a CPET when it is used. Regardless of which side of a case the expert represents, CPETs are used to explicitly and objectively document restrictions, if any, on the ability to work.

Cardiopulmonary Exercise Testing

A review of the case law where aerobic testing is used to document disability in CFS claimants provides insight into how the results can be argued, misconstrued, misinterpreted, and/or simply ignored. Benefits have been awarded and denied for any number of reasons in spite of whether good or poor CPET results occur. Two primary reasons emerge as a result of reviewing case law that explains the mixed legal results. First, there is an obligation to review the entire medical record and review documentation of all diagnosed medical conditions and tests, especially when these tests have results that lead to opposing conclusions. The courts are also sensitive to reliance on the results of a single test and often remand a case when “cherry picking” occurs. Second, disputes regarding the interpretation of stress tests results are common. Differing opinions on the interpretation of MET levels, assertions of malingering, arguments that the patient is merely deconditioned and should exercise more, and challenges to the scientific or clinical legitimacy of aerobic testing have all been used to argue the significance of the CPET results.

The following brief reviews of individual cases illustrate arguments associated with single stress tests where claimants are seeking disability related insurance benefits. The review is broken into two categories of case law relevant to CPET results: (1) good results; and (2) poor results. Numerous issues emerge from these cases relevant to the administration and interpretation of the CPET that beg consideration on the part of exercise physiologists.

Case Law Review

Good Results on the GXT

In O’Sullivan (2002), long-term disability benefits were denied when a 9 MET capacity was found to produce objective evidence of the ability to work. Prudential Insurance Company did not contest the claimant’s CFS diagnosis; instead it simply maintained that there was no objective medical evidence to establish disability. Prudential’s consulting physician relied upon the results of a single CPET to establish sufficient aerobic capacity to do sedentary work.

She was able to reach 9 METs of exercise on a stress test...more than what is generally considered minimally necessary for a sedentary job.” With regard to functional ability, the physician stated that “very little documentation of [claimant’s] actual physical abilities is available in the medical records...The treadmill test documented that she is able to walk uphill for nearly 8 minutes at a time...

Here, while claimant was granted SSA benefits, Prudential's denial of long-term benefits was upheld by the court.

Similarly, in McNabb (2003), SSA benefits were denied a CFS claimant who had a stress test showing a 7 MET capacity. The attending cardiologist's opined that claimant did not have the aerobic capacity to perform a reduced range of medium work on a regular and continuing basis. This opinion was rejected. The primary issue in the case was whether the Social Security Commissioner gave inadequate consideration to the entire record, including the results of the stress test and documentation of other ailments suffered by the claimant. The court held that the Administrative Law Judge properly considered the combination of severe impairments and affirmed the Commissioner's denial of Social Security benefits.

In contrast, Marshall¹(1990) is a case where benefits were awarded in spite of a good result on the CPET. Initially, benefits were denied when the SSA medical advisor found claimant's high level of performance on the treadmill proved that she had the capacity "for at least light work". However, upon appeal the PEM suffered by the claimant as a result of the CPET was central to the final decision to award benefits.

In his decision, the ALJ refers to that test [treadmill test] as 'an objective tool by which the Administrative Law Judge can measure the claimant's fatigue'. This is clearly not the case; *Marshall's [claimant's] performance on the treadmill revealed nothing about the increased fatigue she suffered following the test.* (emphasis added)

It was determined that the treadmill test failed to provide persuasive evidence to contradict the treating and examining physicians. Therefore, the SSA decision to deny benefits was reversed and claimant was awarded benefits. This case raises the issue of the need for a test-retest protocol based upon PEM, a critically important symptom for CFS and possibly other fatigue related illnesses. See discussion below.

In Nickel (2008), benefits were neither denied nor awarded. Instead, the matter was remanded for a "full and fair inquiry" (p. 881) when the court found arbitrary and capricious conduct on the part of Unum Insurance Company's plan administrator for failing to consider claimant's entire record. Claimant, a CFS patient with multiple diagnosed conditions, had contradictory results from a FCE and stress test. The record documented a GXT using a Bruce protocol 12-minute treadmill test wherein the claimant reached 99% of her anticipated heart rate without cardiac complaints. (p. 872) Unum argued that the GXT yielded "above normal exercise results" that were inconsistent with a total lack of work capacity and asserted that claimant was capable of performing her sedentary job as a cytotechnologist at a local medical center. Unum relied upon its medical expert who concluded that the results of

¹Unpublished dispositions when used in this paper are not included as legal precedent. Rather, they are included because they offer insight into the legal use and interpretation of stress tests for the CFS patient.

claimant's FCE demonstrated the ability to undertake sedentary work on a part time basis. The court found that Unum ignored the medical record as a whole by relying upon the FCE as the determining factor and remanded the matter for further consideration.

Poor Results on the GXT

In Magee (2009), Metropolitan Insurance Company's denial of benefits to a CFS patient was vacated and remanded when Metropolitan ignored the results of a GXT that showed impaired capacity for work. In this case, Metropolitan challenged both the diagnosis and the claim of disability. The court acknowledged the unique problem posed by CFS since its cause is unknown, there is no cure, and its symptoms are subjective (p. 318). The court was explicit in noting that "It is...reasonable to insist on some objective measure of claimant's capacity to work, so long as that measure is appropriate" (p. 318).

In addition to other tests, claimant had a two-day GXT that demonstrated substantially impaired aerobic capacity. According to claimant's physician, this objectively documented a functional impairment that rendered claimant unable to work. The court found that the two independent physicians for Metropolitan considered some but not all of the medical record. One physician "did not have the opportunity to review the results of the two-day exercise test" (p. 319) and the other physician ignored the results of the GXT. The failure to consider all objective evidence was, in part, the basis for the court's finding that Metropolitan was arbitrary and capricious in denying benefits and for the court's decision to require further review of the claim for benefits.

In Coffman (2002), a CFS patient with other diagnosed medical conditions, was denied benefits even though his stress test demonstrated an inability to sustain work. Metropolitan Life Insurance Company challenged the GXT results by alleging that the claimant malingered on the GXT, that the fatigue was caused by other conditions, and that the company had video-surveillance evidencing a lack of fatigue.

At trial, claimant's results on the stress test were a subject of back and forth argument. Claimant's attending physician stated that VO₂ max was only 61% of predicted for sedentary individuals and that this poor performance showed the inability of claimant to "sustain work". Metropolitan rebutted by asserting it was based on "a test which clearly revealed less than maximal effort" noting that claimant reached only 73% of his predicted maximal heart rate. The attending physician then responded by stating that claimant was on cardiac drugs (calcium channel blockers) that may have blunted heart rate and that excellent effort on the test was observed in blood pressure readings that increased from 120/80 to 200/94 and increases in oxygen pulse and respiratory rate. He further stated that hyperventilation due to anxiety accounted for a respiratory quotient (RQ) greater than one at the beginning of the test.

Metropolitan also challenged the GXT results by introducing video-surveillance of claimant doing routine activities (e.g., running errands with his wife, driving a car, attending church, carrying two tote bags). This surveillance was used to contradict the

claim that physical limitations precluded work and provided additional support to challenge the results of the GXT. A Metropolitan expert testified that claimant's functional capacities were "compatible with the Department of Labor Work Category definition of light to medium work."

Metropolitan's evidence and argument cast a shadow on the claimant's interpretation of the GXT results. This along with an absence of additional objective medical evidence to support disability resulted in a ruling that upheld Metropolitan's denial of benefits.

Implications and Issues for Cardiopulmonary Exercise Testing

These cases illustrate the importance of expert testimony in presenting and interpreting the results of a GXT. All parties in a case depend upon the accurate and effective testimony of the qualified expert. There is little question from a reading of these cases that a court's opinion is shaped by this testimony. There is also little question that these cases present a plethora of issues that beg further discussion from professionals whose background and training make them uniquely qualified to administer and interpret GXT in disability cases. The following represents only some of these considerations.

Reproducibility of Results and PEM

The hallmark symptom of CFS is PEM, the debilitating fatigue suffered by the CFS patient following what is normally considered routine exertion. Therefore, establishing that PEM exists and is caused by CFS as opposed to another illness is profoundly important to the CFS patient seeking related benefits. If non-fatigue related illnesses demonstrate reproducibility of results on GXTs, a test-retest protocol might be uniquely suited for the CFS patient because it can objectively identify PEM when it exists.

It is well established that normal populations as well as patients with a variety of chronic cardiovascular and pulmonary diseases have reliably reproducible exercise stress tests. Reproducibility has been reported during treadmill or cycle ergometry, has included measurements of peak VO_2 , peak VCO_2 , VO_2 at anaerobic threshold (AT), peak ventilation, peak work rate, lactate threshold, and heart rate, and is especially good at maximal performance (Lehmann, 1996, p. 685). Wasserman argues that test-retest variability should not exceed 8% in Peak VO_2 and VO_2/AT values in clinical and normal groups.

With regard to chronic diseases, high reproducibility of measurements has been found in studies involving patients with a variety of illnesses including heart, lung, musculoskeletal, and renal disease (Hansen, 2004, p. 823). Furthermore, the degree of functional impairment does not appear to affect the reproducibility of parameters assessed (Lehmann, 1996, p. 690). The percentage coefficient of variation (CV%) in these studies range from approximately 1.5% to 10.2% (Hansen, 2004, p. 816-817, 823; Janicki, 1990, p. 16; Koufaki, 2001 p. 1421). Weisman reports a summary of five prior studies that examined test-retest variability in patients with different illnesses.

The averaged variability in Peak VO_2 and VO_2/AT in patients suffering from chronic obstructive pulmonary disease (COPD), interstitial lung disease (ILD), and chronic heart failure (CHF) was 7.28% (Weisman, 2002, p. 28).

However, studies in recent years provide evidence that CFS patients may not be able to reproduce cardiopulmonary results when serial tests occur with 24 hours. This is directly relevant to the objective documentation of PEM.

In 2007, diminished cardiopulmonary values in CFS patients were found in a study involving a maximal stress test-retest within 24 hours (VanNess, 2007). On Test 1, peak MET values for CFS patients were remarkably similar to the controls (7.48 vs. 8.11). These MET levels are strikingly similar to the 9 and 7 MET levels found in CFS patients in O'Sullivan (2002) and McNabb (2003). However, on Test 2 declines in VO_2 peak and VO_2/AT declined in CFS patients by 22% and 27%, respectively, while controls showed minimal variability (2-3%) (Id. at p. 81). Similarly, a 2010 study using a test-retest within 24 hours protocol found a failure to reproduce results in CFS patients. (Vermeulen, 2010). In this study, CFS patients performed worse than controls in a test-retest with 24 hours protocol despite normal oxidative phosphorylation capacity. At both exercise tests, the patients reached AT and maximal exercise at a much lower oxygen consumption than the controls. CFS patient results worsened on Test 2. These studies indicate significant impaired metabolic capability as well as an atypical recovery response in the CFS patients but not the Controls and therefore offer objective documentation of PEM.

The objective documentation of PEM is directly relevant to the ability to work on an ongoing basis. If work on a single day results in a failure to recover within a day, then it is reasonable to expect regular participation in the national economy? How should exercise physiology speak to this issue? Is it reasonable to assert that a single GXT may be inadequate for fatigue related illnesses such as CFS and the expert may require a test-retest protocol to establish the existence of PEM? See Marshall (1990) above.

Malingering on the Test

Poor result cases provide objective evidence for disability but have been successfully challenged on the basis that the claimant cheated the test. See Coffman (2002) above. If expired gases are collected during a GXT, can't the entire issue of malingering be put to rest? Isn't it true that standardized and medically accepted protocols have recognized endpoints upon which exhaustion during a test can be objectively and scientifically documented? For example, end point respiratory quotients (RQs) are widely accepted as objective findings of effort and fatigue. RQs exceeding 1.09 at the end of an 8-12 minute test indicate that peak aerobic capacity has been met and that anaerobic metabolism explains continued participation in the test. An RQ exceeding one coupled with evidence that either (1) Peak VO_2 or (2) heart rates meeting or exceeding 85% of predicted maximal rates is compelling evidence of maximal effort on a stress test. Vermeulen (2010) and VanNess (2007) explicitly commented on and provided evidence of maximal effort by CFS patients. In both studies, endpoint RQs and VO_2 at AT were data points used to objectively document both fatigue and effort.

Metabolism Required for Routine Daily Activities vs. Working

The ability to do errands and chores is often used as evidence of the ability to work a job every day. Recall Coffman (2002) where video-surveillance documented claimant's daily activities and cast a shadow on assertions of chronic debilitation fatigue. Again, the issue of PEM is always relevant in these instances. Further, at least one case found that the ability to do limited daily activities is not inconsistent evidence of disability. In Smith (2003), the court stated "The fact that a claimant is able to engage in limited daily activities, such as washing dishes, doing laundry, and cooking meals does not necessarily demonstrate that she is not disabled."

Nonetheless, specific reference in the medical record of the caloric or metabolic requirements to perform specific jobs or tasks is important. O'Sullivan (2002) explicitly commented on the need for the medical record to specifically document the physician's knowledge of the metabolic requirements for certain jobs. A poor performance on a stress test may not, for example, defeat an argument that sedentary work is within the metabolic capability of a claimant. This argument may be supported by reference to Department of Labor Work Category or specific lists of routine and unskilled jobs within the capabilities of persons with aerobic impairments (e.g., stationary security guard, toll booth operator, ticket taker, car lot attendant) (Swenson, 1989). Evidence of the caloric requirements associated with various tasks/jobs and claimant's metabolic capability to perform would greatly support a rebuttal to the argument. This requires the expert to translate oxygen consumption values into caloric equivalents, a concept more likely to be understood by those without training in exercise physiology.

Functional Capacity Evaluations

A functional capacity evaluation or "FCE" is a standardized assessment tool administered and interpreted by licensed physical and occupational therapists. It is commonly used in disability cases as evidence relevant to determine whether or not a claimant can return to work. Components of the FCE include both an in-depth questionnaire and workstations that require lifting, pushing/pulling, squatting with and without weights, overhead activities and endurance activities, such as maintaining a position for a specified length of time or walking for a specified distance, plus any other work-specific activities that may be performed when at work. Through these standardized tests, consistency effort measurements are taken to establish the level of work that can be performed.

The FCE has an established history and practice of acceptance in both medicine and law is arguable the "gold standard" for assessment of work capacity. However, a review of the literature fails to provide a record of research that validates the FCE for use to evaluate work-related physical functioning in individuals with fatiguing illness. Further, the FCE in court has faced criticisms similar to the GXT, e.g., malingering or cheating the test, cherry picking results, inappropriate use or interpretation of the FCE have all occurred (Hotaling, 1999; Williams, 2007; Smith, 2004).

These fatal flaws beg inquiry by professionals who administer and interpret FCEs in order to determine whether limitations or restrictions on work capacity exist. This is especially important when fatigue is the central issue relevant to work capacity. It is reasonable to assert that under these circumstances the “gold standard” should reflect a direct assessment of metabolic capability. GXTs using protocols where the collection of expired gases occurs represents both an objective and scientifically validated option.

CONCLUSION

The legal challenge for the patient/claimant with a medical diagnosis seeking disability related benefits is providing sufficient objective medical evidence to prove the inability to work. Recall that Social Security policy explicitly enumerates an “abnormal stress test” as an acceptable laboratory finding of a MDI. Nonetheless, the legal debate on whether a medical condition is disabling remains lively. For example, the Ninth Circuit has stated:

That a person has a true medical diagnosis does not by itself establish disability. Medical treatises list medical conditions from amblyopia to zoolognia that do not necessarily prevent people from working. After a certain age, most people have pain, with or without palpation, in various parts of their body, and they often have other medical conditions. Sometimes their medical conditions are so severe that they cannot work; sometimes people are able to work despite their conditions; and sometimes people work to distract themselves from their conditions. Physicians have various criteria, some objective, some not, for evaluating how severe pain is and whether it is so severe as to be disabling (Holifield, 2009; p. 1237). Citations omitted.

To whom does it fall to provide objective evidence of disability? In the case of fatigue related illnesses, is there anyone with greater expertise than the board certified exercise physiologist and the licensed physical therapist? Is there any better assessment than cardiopulmonary exercise capacity testing using standardized protocols?

Fatigue as a common human experience is understood by all on a subjective level. But the objective documentation and interpretation of fatigue is understood only by those with the appropriate background and training. With so much at stake for those suffering from fatigue related illnesses, it is incumbent upon exercise physiology to provide a voice on the appropriate use of the GXT under the circumstances described in this article. Further, it the responsibility of the board certified exercise physiologist and the licensed physical therapists to work with colleagues from other professions who also assess work capacity. Although it is a familiar refrain, the questions remain. If not now, when? If not us, who?

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